

ABSTRACT

This invention aims to measure film thickness and film thickness distribution to high precision in a wide range of transparent films. As one example, in a CMP process, the film thickness of an outermost surface layer formed on a step pattern of an actual product can be measured so that high precision film thickness control can be performed. To achieve an increase of processing throughput, the film thickness of an optically transparent film formed on an actual device pattern is controlled to high precision by incorporating a film thickness measuring unit, which performs frequency analysis of a spectral distribution, in a polishing apparatus. As a result, an increase of processing throughput is realized. To perform the high precision measurement, the frequency analysis is performed on the spectral distribution waveform of interference light from white light due to the film, and an absolute value of film thickness is computed from the relation of the phase of frequency components in the waveform and film thickness.